

REMARKS/ARGUMENTS

Applicants would like to thank Examiner Lawrence for the helpful and courteous discussion held with Applicants' U.S. representative on July 11, 2005. At that time Applicants' U.S. representative argued that the claimed process would not have been obvious over the cited references because a combination of the cited references fails to teach or suggest all of the claim limitations of the claimed process. In addition, Applicants' U.S. representative argued that there would be no expectation of success by combining the cited references. The following is intended to expand the discussion.

The presently claimed process involves the removal of hydrogen sulfide from natural gas. The process includes a step for removing the hydrogen sulfide by absorbing the hydrogen sulfide into virgin naphtha in an absorbing device wherein the molar ratio of virgin naphtha to hydrogen sulfide is between 0.85 and 1.5. Applicants note that the claimed molar ratio allows for the selective absorption of hydrogen sulfide into the virgin naphtha over the natural gas thereby allowing for the separation of the gases. The process is less complicated and more economical than the previously described methods of removing hydrogen sulfide from natural gas. The claimed process is not taught or suggested by the cited references.

The rejection of the claims under 35 U.S.C. § 103(a) over Lebas (GB 232 3093) and Eastman (U.S. 2,870,868) is respectfully traversed.

Lebas describes a process for removing acid gases such as carbon dioxide and hydrogen sulfide from a gas stream containing methane. Lebas uses a methanol solvent to extract the acid gases. Methane is difficult to handle and because of its vapor properties, the process in Lebas requires at least two expansion steps (VI and V2 in Figure 3) that are not required for the presently claimed process. Lebas fails to teach or suggest a virgin naphtha extraction solvent and the claimed virgin naphtha/hydrogen sulfide molar ratio.

Eastman describes a process for the absorption of carbon dioxide from using a light distillate hydrocarbon that can include light naphthas. Eastman, like Lebas, fails to teach or suggest the claimed virgin naphtha/hydrogen sulfide molar ratio. Accordingly, a combination of these references fails to teach or suggest all the present claim limitations, and for at least this reason, the claimed process would not have been obvious over the cited references.

Eastman states that the process can be used to remove carbon dioxide from methane and that other gases such as hydrogen sulfide can be removed by the process. However, Eastman describes a process only for removal of carbon dioxide from hydrogen not hydrogen sulfide from natural gas. Work by others indicates that the process described by Eastman would not be effective in removing hydrogen sulfide from natural gas for the reasons discussed below.

Applicant directs the Examiner to the enclosed U.S. Patent (Ciccarelli, U.S. 6,447,578). Ciccarelli describes a process for the removal of nitrogen from natural gas by absorbing the natural gas into virgin naphtha. Ciccarelli demonstrates that virgin naphtha absorbs natural gas. Therefore, under most conditions it would not be possible to separate natural gas from other gases like hydrogen sulfide, since virgin naphtha under most conditions absorbs natural gas. However, Applicants have found that when the virgin naphtha/hydrogen sulfide molar ratio is within the claimed range, hydrogen sulfide is preferentially absorbed by the virgin naphtha over the natural gas thereby providing for an effective separation mechanism. This result is not taught or suggested in Lebas or Eastman. Indeed there is no reasonable expectation that hydrogen sulfide could be selectively removed from natural gas by use of a process that combines the teachings of Lebas and Eastman. Use of a process that is a combination of the cited references would not provide the selective absorption of hydrogen sulfide into the naphtha because the claimed molar ratio was unknown to Lebas and Eastman. In other words, a combination of the cited references gives

a process that cannot effectively separate hydrogen sulfide from natural gas because under the conditions of the cited references both hydrogen sulfide and natural gas would be absorbed by the naphtha as evidenced by the teachings of Ciccarelli. Accordingly, the claimed process would not have been obvious over a combination of the cited references because there is not an expectation of success.

Overall, the cited references do not teach or suggest all the claim limitations of the claimed process. In addition, Ciccarelli discussed above demonstrates that there would be no expectation of success by a combination of the cited references. Accordingly the claimed process would not have been obvious over the cited references. Therefore, Applicants respectfully request that the Examiner withdraw the rejection under 35 U.S.C. § 103(a) over Lebas and Eastman.

Finally, as the Examiner will note, Applicants have amended the specification and claims such that they are free of the criticisms on page 2 of the Office Action. Accordingly, the objections should be withdrawn.

In light of the above remarks contained herein, Applicants respectfully submit that the present application is now in condition for allowance. Favorable consideration is respectfully requested.

Respectfully submitted,

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